Excavation & Trenching

Purpose: To recognize the dangers of Trenches and Excavations and eliminate the hazards by making them safe for workers and the public.
References: OSHA std. 1926.650 Subpart P Excavations

Required PPE: Safety Boots, Gloves, Safety Glasses/ Goggles, Hard-hats, and Safety Vest, ladders, trench boxes or Forms Depending upon location.

Trench or Excavation?? What's the difference?
OSHA defines the excavation to mean *"any man-made cut, cavity, trench, or depression in an earth surface, formed by earth removal."* So, an excavation can be any type of digging into the earth. Think of the excavation as being a wide hole.

The trench on the other hand is defined by OSHA as: *a narrow excavation (in relation to its length) made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet (4.6 m). If forms or other structures are installed or constructed in an excavation so as to reduce the dimension measured from the forms or structure to the side of the excavation to 15 feet (4.6 m) or less (measured at the bottom of the excavation), the excavation is also considered to be a trench.*

What are the Hazards?

Water Accumulation - Water can accumulate in the trench during the night from ground seepage, rain, storms, drains or other problems with the area. Water not only accumulates in the trench, but it also weakens the side walls of the trench making a cave-in more likely. Look for fissures (cracks or gaps) in the ground to recognize the hazard.

Slips, Trips and Falls - into the trench can occur simply because people are not paying attention to where they are walking or while they are walking. The edges of the trench can also give way if they walk too close. Keep the trenches and excavations marked clearly with barricades or red tape.

Hazardous Atmospheres - During the work in a trench, dangerous gases can build at the bottom. Gases which are heavier than air can cause the personnel to become faint or dizzy and pass out or stop breathing. An example would be Carbon Monoxide given off by equipment or

vehicles running in the area. These heavy gasses seek the lowest point to accumulate and require ventilation or fans to remove the air out of the spaces where workers are at.

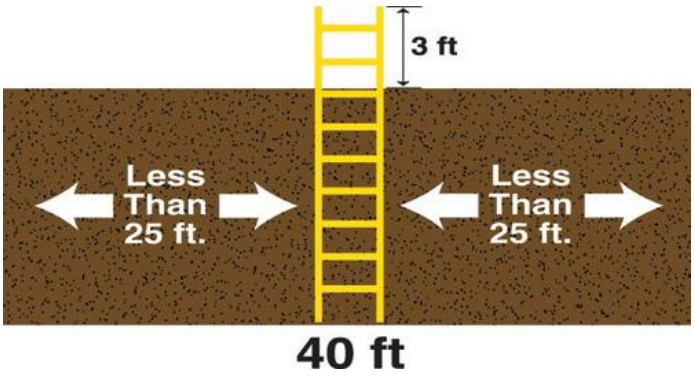
Cave in or collapse - One of the most dangerous things that can occur is the potential for the dirt to cave in around the employee while working in the space. Weak soil from rain, ground water and vibration of equipment can cause the soil to cave in. Even highway or roadway traffic can cause the soil to cave in on the worker. Dirt piling up around your legs, waist or chest can kill you.

Another danger of Trenching is **falling loads**. While working in the trench, heavy equipment may be operating overhead. Equipment places the trench walls under heavy pressure and can cause the cave in. Operators dumping material like rock or pushing soil back into the trench may not have their eyes on the personnel in the trench. All workers in the trench must stay clear of the material being used to fill in the trench and make sure that the operator is aware of their location. Employees and personnel must not work under loads going into a trench. Use taglines if necessary to prevent workers from standing close by the pipes.

How do I make the trench Safe?

Make sure your personnel know the location of the workers in a trench or excavation. Keep your equipment away from the edges of the trench and take the basic precaution of filling out a ***Trenching and Excavation permit*** before the work begins, during shift changes and when anything occurs that can change the nature of the trench or excavation. Utilize the following methods to make the trench more stable:

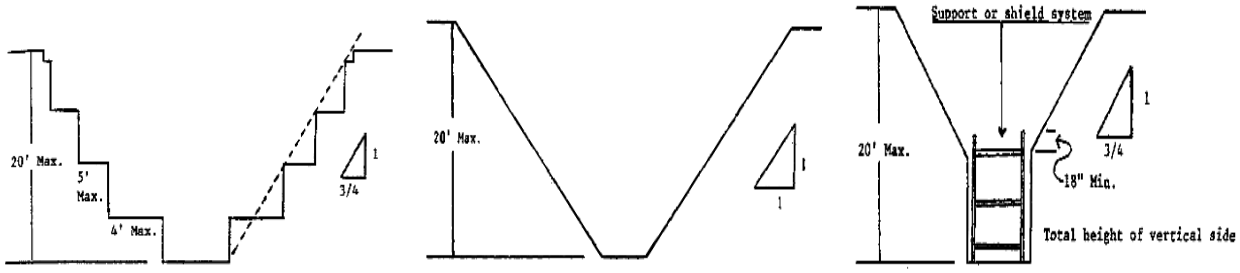
Utilize a Trench Box



Ensure at ladder or exit is within 25' of the employee.

Never fill material to the top edge of a trench box. Keep all fill materials at least 18" below the top edge. All work is to be done inside of the trench box and workers must enter and exit the trench box from a ladder.

Test the soils so that you are aware of its stability. Soil that is less cohesive, (sand, sandy loam, loam or plain dirt) has more potential to wash into or cave into a trench than clay or stable rock. Diagrams of sloping or benching resemble these drawings (not all are shown) and are based on soil conditions.



Any trenching that is done in unstable soil or soil that has been previously disturbed is considered class C soil and must be sloped back to a 1.5 to 1 ratio (Horizontal to Vertical). Another method of ensuring that workers are kept safe is to use a man-made trench box. These boxes use heavy timbers, shoring, whalers and thicker plywood to keep the trench walls from collapsing.

It should be noted that once a trench goes over 4 feet deep, it becomes a confined space. Extra precautions must be taken when this occurs. Any trench that goes over 5 feet in deep must be trenched with sloping, benching, shoring or trench boxes.

The competent person who has been trained on what to look for must inspect the trench each day and remain on-site while personnel are in the trench. He or she must have the authority to stop the work if hazardous conditions are detected.

Call before you dig. To avoid the potential of hitting an under-ground power line or gas line, Call 811 for the NC locator service.

Daily Inspection of Trenches and Excavations

Supervisor:_____ Competent Person: _____

Project:_____ Date:_____ Weather:_____ Soil Type: _____

Trench Depth:_____ Length:_____ Width:_____

Type of Protective System: _____

	Excavation	**Yes**	**No**	**N/A**
1	Excavations and Protective Systems Inspected by Compo Person daily, before starting work, or when conditions change?			
2	Competent Person has the authority to remove workers from excavation immediately?			
3	Surface encumbrances supported or removed?			
4	Hard Hats worn by all employees?			
5	Spoil, materials, and equipment set back a minimum of 2' from edge of excavation?			
6	Barriers provided at all remote excavations, wells, pits, shafts, etc.			
7	Walkways and bridges over excavations 6' or more in depth equipped with guardrails?			
8	Highly visible PPE provided or worn by all employees exposed to vehicular traffic?			
9	Employees prohibited from working on faces of slope or benches over other employees?			
10.	Warning system estabished and used when mobile equipment is operating near edge?			
	Utilities	**Yes**	**No**	**N/A**
1	Utility companies contacted and/or utilities located?			
2	Exact location of utilities marked when near excavation?			
3	Underground installations protected, supported, or removed when excavation is open?			
4				
	Wet Conditions	**Yes**	**No**	**N/A**
1	Precautions taken to protect employees from accumulation of water?			
2	Water removal equipment monitored by Competent Person?			
3	Surface water controlled or diverted?			
4	Inspection made after each rainstorm?			
	Hazardous Atmosphere	**Yes**	**No**	**N/A**
1	Atmosphere tested when there is a possibility of oxygen deficiency or haz. gases?			
2	Oxygen content is between 19.5% and 21%?			
3	Ventilation provided to prevent flammable gas build-up?			
4	Emergency Response Equipment readily available where a hazardous atmosphere could or does exist?			
5	Employees trained in the use of PPE and Emergency Response Equipment?			
6.	Safety harness and life line individually attended when employees enter deep confined excavation?			